

# Workforce 2025

## Missouri's Labor Force of Tomorrow



Presented to:

**Governor Matt Blunt**

By:

**Missouri P-20 Council**

Department of Economic Development

Department of Elementary and Secondary Education

Department of Higher Education

Coordinating Board for Higher Education

State Board of Education



## Table of Contents

<b>Executive Summary</b>	<b>1</b>
<b>Introduction</b>	<b>5</b>
<b>Demographic Trends in 2025</b>	<b>9</b>
<b>Economic Landscape</b>	<b>10</b>
<b>New/Emerging Occupations</b>	<b>12</b>
<b>Targeted Industry Clusters</b>	<b>13</b>
<b>Foundational Competencies</b>	<b>14</b>
<b>Teacher Quality</b>	<b>19</b>
<b>Advanced Competencies</b>	<b>20</b>
<b>Retraining the Adult Workforce</b>	<b>23</b>
<b>Right Skills for the Right Jobs</b>	<b>24</b>
<b>Talent Recruitment &amp; Retention</b>	<b>25</b>
<b>Conclusions</b>	<b>27</b>
<b>Appendices</b>	<b>28</b>

## Executive Summary

### *Background*

Upon taking office in 2005, Missouri Governor Matt Blunt took a dynamic and aggressive approach to economic development. He worked with the legislature to implement new economic incentives, eliminate regulatory barriers, and enact reforms that put businesses in a position to create more high-quality, family-supporting jobs for Missourians. The result has been a surge in job growth just a few years after leading the nation in job loss. Since January of 2005, Missourians have created over 90,000 new jobs.

Additionally, Governor Blunt also recognizes that lasting economic growth for Missouri requires a competitive workforce, and has made offering a world class education for Missouri students his number one goal. Instead of competing with surrounding states such as Kansas and Illinois for highly skilled, family-supporting jobs, we are facing competition from countries like China and India whose populations are outpacing ours in terms of sheer numbers, education, and skill attainment. In this New Economy, Missouri students and our state's workers must be armed with the essential knowledge and skills needed for success, including a firm educational foundation in math and science.

Emphasis on improving student learning in mathematics while also enhancing teacher preparation to teach in demand skills was the focus of the former K-16 Coalition, formed in 1997, which involved the Coordinating Board for Higher Education, the State Board of Education, and the University of Missouri - Board of Curators. Missouri's initial K-16 report, *Mathematics in Missouri*, contained recommendations to improve student learning in mathematics, enhance teacher preparation, and integrate quality, content-driven professional development programs. Since that initial work by the Coalition, Missouri has continued to push for the improvement of math and science skills in the P-20 system.

The importance of Mathematics, Engineering, Technology and Science (METS) to the future well-being of Missouri and the nation was firmly established at Governor Blunt's METS Summit held on April 25, 2006. Post-summit activities included the formation of a METS Alliance and the development of a preschool through graduate level (P-20) action plan organized around five major goals:

- Improve the performance of all P-20 students;
- Expand the pool of students motivated to pursue METS careers;
- Expand the pool of Missouri's P-20 METS educators;
- Establish a technology plan to support METS curricula, Missouri Grade Level Expectations (GLEs) and assessments in Missouri;
- Increase public awareness of the value of METS knowledge on the lives of all Missourians and highlight the importance of METS-related industries and jobs in enhancing Missouri's global competitiveness and innovation.

## *Workforce 2025 Profile*

Despite notable accomplishments since the 2006 Summit, there is significant work ahead if Missouri is to lay a firm foundation for long term economic competitiveness. A look at future economic and educational projections can be useful in informing policy and planning. While it is impossible to predict an accurate snapshot of the 2025 labor market, there are compelling trends that can be gleaned from the data.

- Missouri's total population is projected to increase by 9.5 percent from 2005 to 2025. During that time, Missouri's older population groups are projected to increase in size relative to the state's population as a whole.
- Many of Missouri's top employing sectors will require significantly more math and science intensive occupations while at the same time facing high percentages of workers retiring.
- Sixty percent of Missouri's workforce in 2025 is already working today.
- Skill attainment will be just as critical as degree acquisition in terms of the ability to meet the expanding needs of future employers. The abilities to continually adapt and think quickly are skills that will ultimately contribute to organizational success in the economy of 2025.
- New technologies will be embedded in nearly every job in 2025. A functional level of digital literacy will be required of every worker if they are to remain marketable in an increasingly high-tech 2025 economy.
- By 2025, thousands of additional occupational titles will be created, many of which will require basic and advanced competencies in math and science, the cornerstones of the innovation economy.
- Missouri's labor pool is projected to become more diverse by 2025, with the Hispanic population growing and participating in the labor force at an above average rate.

## *Challenges*

A look at economic and educational trends suggests that despite notable pockets of excellence, our state is not providing enough students with foundational and advanced math and science skills to sustain economic growth in the years ahead.

For instance:

- The percentage of Missouri 4th and 8th graders scoring at or above the proficient level in math was below the national average. Missouri students did score better on the science assessments, above the national average and with more consistency between 4th and 8th grade.
- The percentage of first-time freshman enrolled in remedial math and reading classes at Missouri public institutions has increased.
- There are fewer college graduates in science and mathematics-related fields than there were 20 years ago.
- Significantly more jobs in the future will demand higher levels of math and science skills to work in those jobs.

While **quantities** of degreed professionals may be sufficient to meet overall occupational demand in the coming years, evidence suggests that there are significant gaps in **quality**. However, quantity gaps do exist for certain occupations and in certain regions throughout the state. Much work needs to occur at the regional level to address specific workforce gaps to ensure that Missourians have the right talent to fit future occupational demand, which includes the need for continued worker training and lifelong learning opportunities.

### *Existing Initiatives*

Missouri already has a number of initiatives underway to help prepare Missourians for career opportunities that await them in the global economy.

- **P-20 Council:** In 2006, Governor Blunt signed into law the creation of the Missouri P-20 Council. The Council consists of the state's two education agencies – Department of Elementary and Secondary Education (DESE) and Department of Higher Education (DHE); and unlike most states, the Department of Economic Development (DED), the agency with primary responsibility for meeting the needs of business and industry. The role of the Council is to provide better, stronger, and more aligned education and workforce training systems.
- **METS Coalition:** A key recommendation following the April 2006 Summit called for the creation of a non-profit organization to oversee the efforts to improve METS performance in the state and increase the public's awareness of the issues facing employers and employees. The METS Coalition is now operational and making significant contribution to METS education in Missouri.
- **DED Targeted Industry Clusters:** The Missouri Department of Economic Development is targeting its business attraction and retention efforts, as well as workforce development, around eight targeted industry clusters. Resources are currently being deployed to bring together the appropriate state and local individuals to identify and address gaps in specific industry and occupational skills within the targeted industry clusters.
- **Promising Practices:** State and local leaders throughout Missouri have an exemplary portfolio of promising initiatives that are helping to address the mismatch between workforce preparation and occupation demand in the years ahead. They are cited throughout this document, and include Workforce Innovation in Regional Economic Development, Project Lead the Way, Achievement First, A+ Schools, Access Missouri, Curriculum Alignment Initiative, etc.
- **New Data Analysis:** The Departments of Higher Education, Elementary and Secondary Education, and Economic Development all house very rich data systems that produce informative analysis and intelligence about our economic and educational assets. They have begun to share and analyze data in new ways to better inform policy, planning and administration of education and workforce programs at the state and local levels.

## *Next Steps*

In the 2025 economy, Missouri will be more than a state that consumes its share of high-technology goods and services; we want to be a national leader in the creation of high-tech innovations that drive high-wage jobs and improve the quality of life for all Missourians. This will require that we re-double our efforts to create an educational advantage that complements our many assets, including our pro-business climate, quality communities, and enviable geographic and regional advantages. While it is impossible to accurately predict future workforce supply and demand in an innovation economy, the initial review of economic and educational trends suggests there are several compelling issues to be addressed by state and local leaders across all sectors – public, private, and not-for-profit.

If Missouri is to reap the rewards that are awaiting those who embrace a culture of lifelong learning, we must coordinate our efforts as a state and rally around key education and workforce strategies that will place Missouri at the forefront of an economic transformation unlike any other in its rich history.

These strategies should focus on:

- Regional summits to raise awareness, network assets, plan, and act locally to improve the quality and relevance of education and training to ensure that Missourians have the right talent and fit for family-supporting jobs specific to those regions.
- A continued emphasis on implementing the METS recommendations to ensure that P-20 education in Missouri is preparing a critical mass of students for high-wage math and science intensive occupations of the future.
- Forging greater collaboration among state departments responsible for K-12, higher education, and economic development to improve vertical alignment from one educational level to the next as well as horizontal alignment with future business and industry demand.
- A continued emphasis on targeting high-technology industry clusters in a coordinated fashion to address their specific needs, including the need for a sustainable pipeline of well-educated, highly-skilled workers.
- Maximizing community assets to improve Missouri's attractiveness to young degreed professionals, both home-grown and those recruited from other locales.
- A continued retooling of adult workforce programs to ensure that flexible opportunities for relevant skill development are available to current workers who are projected to make up over half of the 2025 workforce and who will need to continuously learn, unlearn, and relearn 21<sup>st</sup> century competencies.
- Recognizing that significant numbers of Missouri's workers are aging and working beyond normal retirement age. Adult retraining offerings will need to be flexible enough to accommodate those mature workers who chose to reinvent themselves for new careers.
- Recognizing that Missouri's emergent workforce is becoming increasingly more diverse and in need of robust strategies to provide services for individuals with English as a second language.



## Introduction

### *A Changing Economy*

There can be no doubt that the global economy has changed and will continue to change the way that Missouri conducts business. Instead of competing with surrounding states such as Kansas and Illinois for highly-skilled, family-supporting jobs we are facing competition from countries like China and India, whose populations are outpacing ours in terms of sheer numbers, education, and skill attainment. The new driver of global economic competitiveness is the ability to produce a critical education mass with core competencies in math and science. However, despite notable pockets of excellence, Missouri is not providing enough K-12 students with foundational math and sciences skills.<sup>1</sup> In addition, there are fewer Missouri college graduates in science and mathematics-related fields than there were 20 years ago. The number of graduates obtaining any post-secondary degree (bachelor's, master's, or doctorate) in mathematics, education, life/physical science, and engineering has been steadily decreasing in our state. Exasperating the issue is the fact that half of the top employing sectors in Missouri over the next decade will require significantly more math and science intensive occupations and at the same time have the highest percentage of workers facing traditional retirement age.<sup>2</sup>

Education is the new driver of global economic competitiveness.

For the baby boomer generation, retirement at the traditional age of 65 is becoming less and less of a reality. Over 79% of boomers state that they plan on working during their retirement years.<sup>3</sup> While an aging workforce does not necessarily present an issue of labor shortage over the next decade, the need to retrain those whose skills do not meet the demands of tomorrow's jobs will be a concern. For individuals retiring from occupations that are being phased out due to technological advances, training that allows them to effectively utilize new technology will be needed. In the years ahead, most of the people who will determine the outcome of Missouri's economy are already working. Assuming that all Missourians aged 16 to 65 are eligible to work, nearly 60 percent of the eligible workforce in 2025 was already working in 2005, even more if it was assumed that the normal retirement age extends to 70 years. In addition, the future workplace will be more diverse. In 2020 the labor participation of Hispanics is expected to be higher than that of all other groups.

New technologies will be embedded in every occupation in 2025.

For the workforce of 2025, skill attainment will be just as critical as degree acquisition in terms of being able to meet the expanding needs of future employers. As business models develop and change at an ever-increasing speed, individual workers will need to learn to adapt to unpredictable circumstances in the workplace just as quickly. The abilities to continually adapt and think quickly are skills that will ultimately contribute to organizational success in the economy of 2025.<sup>4</sup> Individuals will need to continually update their skills as technology advances and changes their work tasks. Whether it is a farmer who uses the latest GPS enabled equipment to mitigate against diseased soil, a

security guard who monitors biometric scanning technology, a nurse who spends on average half of his or her time monitoring patients via electronic equipment, or a CEO who oversees a

web of virtual networks to strategically manage global assets, a functional level of digital literacy will be required of every worker if they are to remain marketable in an increasingly high-tech 2025 economy.

While it is impossible to predict specific 2025 labor market needs with complete accuracy, there are indicators that point to compelling issues to consider in the years ahead. Technological advances combined with skill needs of both emerging and current workers along with a workforce that is aging and increasing in diversity creates a perfect storm in terms of the need to create strategies for filling future jobs with an educated Missouri workforce. A lack of planning now will not stop current industry trends of needing a more highly skilled and flexible workforce, but will ensure that Missouri will not be a global player in the new economy over the next decade.

### *A Regional Approach*

Missouri is a diverse state with a rich variety of economic and educational assets. Whether it is the world's largest concentration of animal health goods and services in the Greater Kansas City area, the robust cluster of plant and medical science firms in and around St. Louis or the agribusiness growth in out-state Missouri, the challenges and opportunities posed to both business and education leaders can vary significantly across the state. Therefore, it is important to regionalize the collection and analysis of trend data to better inform planning and policy development.

One driver behind the successful Workforce Innovation in Regional Economic Development (WIRED) is the fact that the front lines of the global talent battlefield are regional, where companies, workers, researchers, entrepreneurs, educators and government come together to create a competitive advantage.<sup>5</sup> This report recognizes this truth by also providing seven regional profiles that will aid regional leaders in developing local solutions to unique problems throughout Missouri.

### **P-20 Promising Practice:**

#### Workforce Innovation in Regional Economic Development (WIRED)

WIRED is an innovative U.S. Department of Labor (USDOL)-funded approach to workforce and economic development. It goes beyond traditional strategies for worker preparation by bringing together state, local, and federal entities; academic institutions (including K-12, community colleges and universities); investment groups; foundations; and business and industry to address the challenges associated with building a globally competitive and prepared workforce. Missouri has received two WIRED grants – Greater Kansas City and Southeast regions.

### *A Targeted Approach*

Considerable rewards accrue to states and regions who implement targeted cluster strategies to meet the needs of business and industry. One strategy being used to move Missouri's economy toward meeting the needs of growing industries is the targeting of business attraction and retention efforts as well as workforce development around eight targeted industry clusters.



Industry clusters are defined as groups of interdependent businesses linked by core products or services as well as the potential for common supply chains, labor needs, technologies, and markets.<sup>6</sup>

These targeted industries defined by the Missouri Department of Economic Development (DED) are:

- Agribusiness
- Automotive
- Defense & Homeland Security
- Energy
- Finance
- Information Technology
- Life Sciences
- Transportation/Logistics

For each of the targeted industry clusters, Industry Specialists are being hired to help spur job growth and strengthen Missouri's economy. The Specialists will work directly with newly created *Industry Councils* comprised of 10-12 CEO's from each of the eight defined industries listed above where Missouri shows a competitive advantage. The CEO's will actively participate in the creation of strategic plans intended to direct growth in each of the respective industry sectors. The alignment of education and workforce program offerings with the future talent development needs of the targeted industry clusters is important for the Industry Councils to be effective. Resources are currently being deployed by the Departments of Elementary and Secondary Education (DESE) and DED to bring together the appropriate state and local individuals to conduct competency model planning to identify and address gaps in foundational, industry, and occupational specific skills within the eight targeted industry clusters.

Strategies are underway to develop home-grown skills in high technology industries.

### *Competencies for Targeted Industries*

As part of the strategy to attract, retain, and develop targeted industries, Missouri will need to develop a workforce with skill sets that meet the demands of rapidly changing and increasingly technical occupations. Development of competencies, or related knowledge, skills, and abilities required to successfully perform "critical work functions"<sup>7</sup> around the needs of targeted industries is critical in terms of both meeting employment demand as well as to identify training gaps for growing occupations. The U.S. Department of Labor competency model (Appendix A) is a collection of competencies that together define successful performance in a particular work setting and can be developed for targeted industry clusters. Competency models for targeted industries serve as the foundation for important human resource functions such as recruitment and hiring, training and development, and performance management because they specify what is essential to select for or to train and develop growing occupations. In each competency model, there are three levels of competencies: Foundational Competencies (Tiers 1-3), Industry-Related Competencies (Tiers 4, 5), and Occupation-Specific Competencies (Tiers 6-9).

### *Math & Science Skills for Tomorrow*

Missouri's capacity to create new jobs in the targeted clusters and to develop a critical mass of talent to fill those jobs will depend on the state's ability to grow and nurture Math, Engineering, Technology, and Science (METS) competencies. In terms of the impact of METS occupations on Missouri's economy, such occupations are projected to grow at a rate of 20 percent from 2004-2015 with over 22,000 openings. To meet this future demand for highly-skilled occupations, Governor Blunt's METS Initiative places an increased focus on METS-related skills shortages and the coordination of workforce education and training for Missouri's young people. The purpose of the initiative is to raise awareness and to recognize the challenges that Missouri will face in the coming years if more students are not fully prepared for careers that require knowledge and skills in mathematics, engineering, technology, and science.

As part of the METS Initiative, an alliance of 20 representatives from state and local government, public education systems, and Missouri businesses were tasked with developing an action plan to implement five key strategies to better prepare Missouri students for METS careers that await them in the global economy (Appendix B). Additionally, the Governor has supported increases in funding to support Math, Engineering, Technology, and Science (METS) education programs that will engage students, offer challenging coursework and help prepare students to compete in the global economy. The governor has also directed the DESE, the Department of Higher Education (MDHE), and DED to work with business communities to regularly promote, monitor, and assess Missouri's METS curriculum in an effort to improve performance of all students beginning with early years of learning.

The economic future of Missouri depends on the quality of education provided to the future workforce. It is critical that youth obtain the skills needed to succeed in the 21<sup>st</sup> Century and this demand-driven economy. Under this initiative, students will have a high level of technology expertise and skills to compete in a global economy. Technology in the classroom improves students' learning; therefore, securing these tools is essential to improve competitiveness and quality of life.

### **P-20 Promising Practice:**

#### [eMINTS Instructional Model](#)

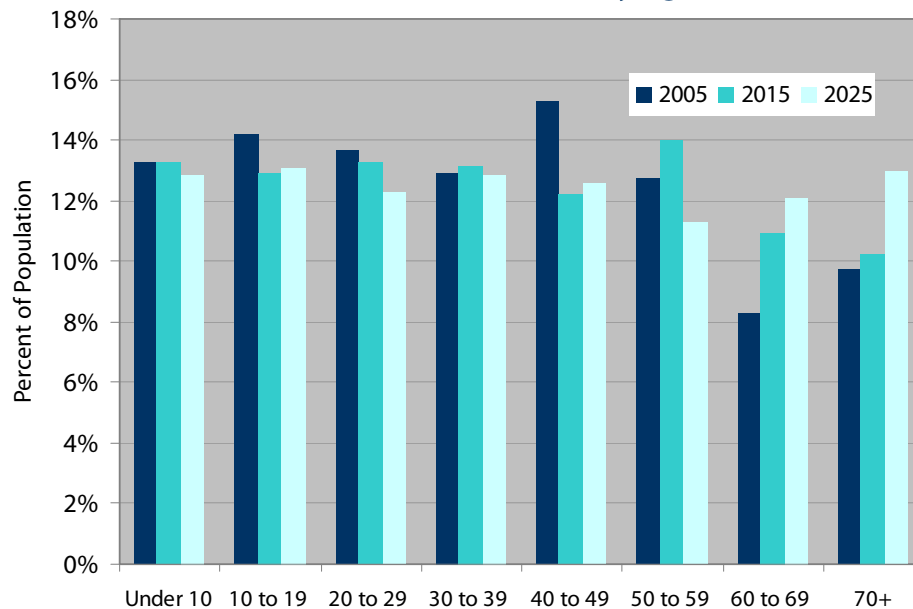
eMINTS changes how teachers teach and students learn. Its instructional model provides a research-based approach to organizing instruction and can be implemented in any subject area at any level. The eMINTS instructional model enables educators to create classrooms where all students are motivated to succeed socially and academically, fully incorporate technology investments into teaching and learning, complement existing preK-16 curriculum with critical-thinking requirements found in national, state and local curriculum standards, and build enthusiasm and creativity into daily teaching. Research shows that enrollment in an eMINTS classroom is beneficial for increasing MAP scores for both the Communication Arts and Mathematics tests. The eMints model is currently offered in over half of Missouri's school districts in nearly 1,400 elementary, middle, and high school classrooms.

## Demographic Trends – 2025

### Population Diversity and the Aging Workforce

Missouri's total population is projected to increase by 9.5 percent from 2005 to 2025. During that time, Missouri's older population groups are projected to increase in size relative to the state's population as a whole.

**Change in Missouri's Population Composition  
2005, 2015 and 2025, by Age**



Source: U.S. Census Bureau, Population Projections

In addition to ensuring that future workers are prepared for the jobs of the future, it is important to consider the skills and abilities of those already working.

Assuming that all Missourians aged 16 to 65 are eligible to work, nearly 60 percent of the eligible workforce in 2025 was already working in 2005, even more if it was assumed that the normal retirement age extends to 70 years old.

The Hispanic population in Missouri is projected to increase by more than 98,000 individuals from 1995-2025.<sup>8</sup> National trends indicate that these emerging populations over the next decade will be predominantly adding to younger age groups. The increasing diversity of Missouri's emergent workforce will significantly affect the P-20 system in terms of how it provides services for individuals with English as a second language.

In addition, projections indicate that the overall labor force participation rate nationally will continue to gradually decrease from 66.0 percent in 2005 to 60.4 percent in 2050. In 2020, labor force participation in the Hispanic population (68.4%) will exceed that of the White, non-Hispanic population (66.1%). This trend toward an increasingly diverse labor pool will significantly affect how the workforce system provides services to Missouri employees.

**US Population by Ethnicity, 2010-2020**

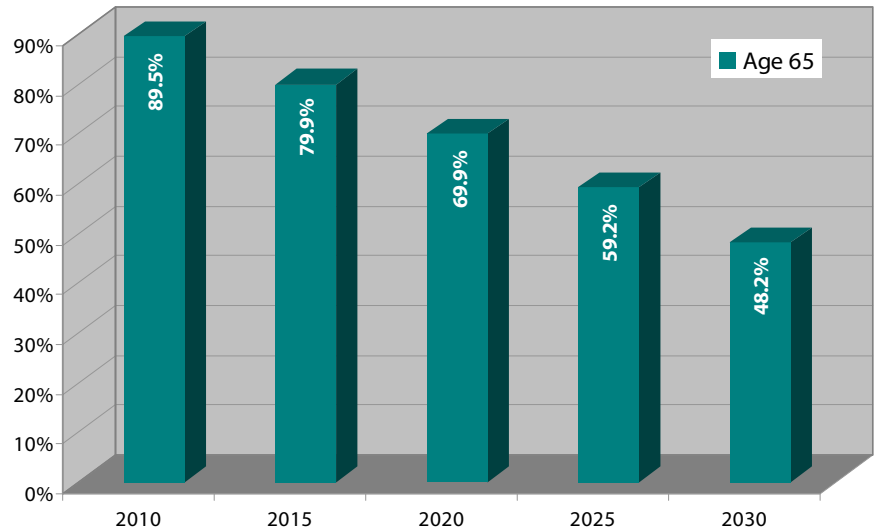
Race and Ethnicity	Annual Growth Rate (%)
<b>Race</b>	
White	0.6
Black	1.2
Asian	2.5
All other	2.6
<b>Ethnicity</b>	
Hispanic origin	2.5
Other than Hispanic origin	0.5
White non-Hispanic	0.2

Source: U.S. Bureau of Labor Statistics

Some industries may be more impacted by the aging population than others. Industry sectors with heavy concentrations of employment in older populations may be more likely to face worker shortages.

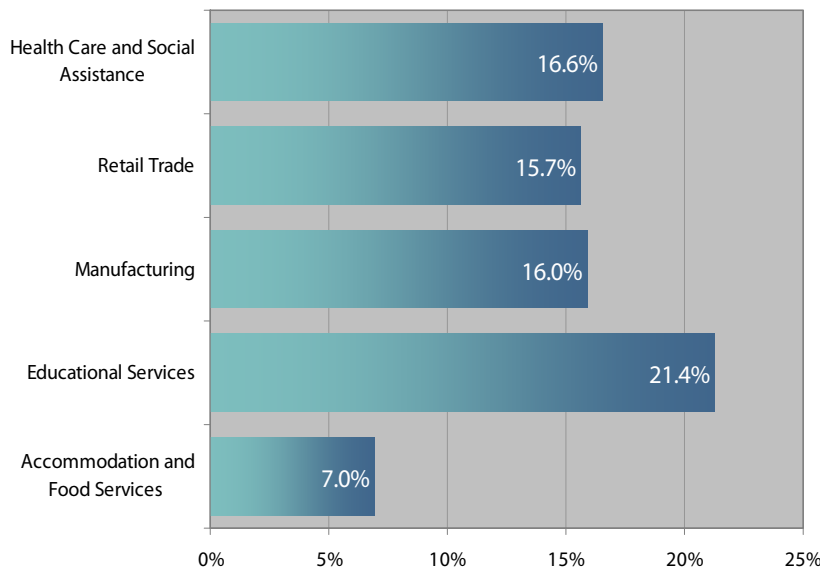
On average in Missouri, 15.5 percent of workers are over age 55. Of Missouri's top 5 employing industries, four have higher than average percentages of workers over age 55. In particular, with 21.4 percent of workers over age 55, Educational Services in Missouri has the highest percentage of any industry.

## % of Today's Workforce (2005) in the Future



Source: MERIC, U.S. Census Bureau

## Missouri's Top 5 Employing Industries Percentage of Workers over Age 55



Source: U.S. Census Bureau and MERIC LED Program

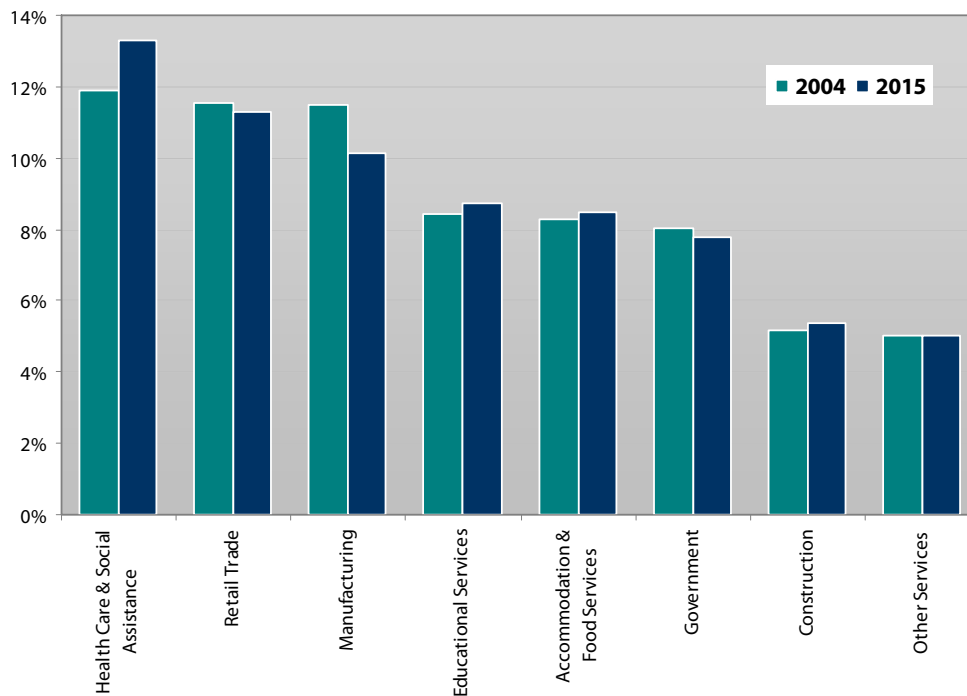
## Economic Landscape

Understanding how demographic and migration patterns affect the makeup of Missouri's future workforce must be aligned with knowledge about how Missouri's economy will change over the next decade. Missouri is a diversified state. Of the 22 major industry sectors, eight make up nearly 70 percent of total employment in the state.

Each of these industries comprise 5 percent or more of the state's jobs, while three make up more than 10 percent each: Health Care and Social Assistance, Retail Trade, and Manufacturing. Educational Services, Accommodation and Food Services, and Government follow close behind with each employing 8 percent or more of the state's workforce. Although the top eight industries are projected to still be the top eight in 2015, there are some projected changes in the share of the industries' employment in Missouri.

Employment in the Health Care and Social Assistance industry is projected to grow by 23 percent by 2015, an increase of over 74,000 jobs. Growth in this industry is projected to be driven by increases of over 35 percent in Social Assistance and Ambulatory Health Care Services. Other top industries that are projected to gain in share by 2015 are Educational Services, Accommodation and Food Services, and Construction. Manufacturing is projected to continue to decline in employment in the next ten years. By 2015, employment in the manufacturing industry is projected to make up only 10 percent of the state's total employment. Other top industries that are projected to decline in employment share by 2015 are Retail Trade and Government.

### Projected Change in Employment Share for Missouri's Top Eight Industries

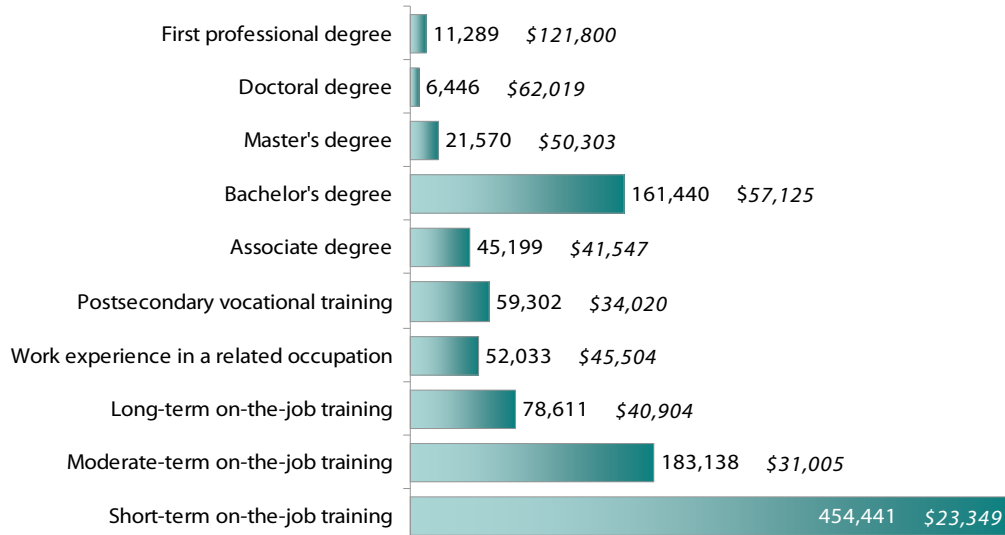


Source: MERIC Long-Term Industry Projections, 2004-2015

### Occupational Outlook

Of the almost 800 occupations in Missouri, the 30 largest employing occupations (Appendix C) make up nearly 41 percent of the state's total employment. Despite some changes in rankings, 29 of the top 30 employing occupations in 2004 are projected to be in the top 30 in 2015. Personal and Home Care Aides are the only new addition to the 2015 list, displacing Construction Laborers from the 2004 rankings. Employment in Missouri is projected to increase by 9.2 percent by 2015, with over 300,000 total openings due to growth during that time period. The largest portion of those openings, in general, need only short-term on-the-job training, but nearly 28.4 percent will likely require education and training beyond high school. Occupations in the state that generally require advanced education and training tend to be the fastest growing. Jobs that typically call for an Associate's degree are projected to increase by 21.8 percent, followed by Doctoral degree (21.6 percent) and First Professional degree (17.2 percent).

### Total Openings by Education and Training Level 2004-2015 with Average Annual Wages



Source: MERIC Long-Term Occupational Projections, 2004-2015

## New/Emerging Occupations

New technologies, business practices, and social settings will naturally prompt new industries and occupations in Missouri's economy over the next decade. The O\*NET-SOC classification system has a process to identify, evaluate, and incorporate New and Emerging (N & E) occupations nationally by focusing on high growth industries and new occupations created within these industries.<sup>9</sup>

There are 102 N & E occupations identified recently which fit into 11 different industry sectors. The industry sector with the most N & E occupations is Health Care, with 37 occupations. This is nearly triple the number in the next closest industry sector—Advanced Manufacturing with 14.

Industry Sector	Number of N & E Occupations
Health Care	37
Advanced Manufacturing	14
Biotechnology	13
Transportation	9
Financial	6
Geospatial	6
Information Technology	5
Energy	4
Construction	3
Retail	3
Hospitality	2

Source: New and Emerging (N & E) Occupations, O\*NET

Incorporating N & E occupations more rapidly has the potential to benefit many users in the public and private sectors while these occupations are growing. Individuals seeking new careers or new pathways within existing careers will benefit from this effort as well as educational institutions developing training programs to meet workforce demands, and companies writing job descriptions for workers in a changing environment.



## Targeted Industry Clusters

Missouri is currently targeting eight industry clusters, building upon current strengths to generate future growth and prosperity. More than 29,000 businesses in Missouri are classified (Appendix D) in the state's eight targeted industry clusters. Employment in these clusters totaled nearly 520,000 in 2006, making up 22.6 percent of the state's total employment. These are primarily small businesses, as 93 percent of the firms employ fewer than 50 people, with an average of 18 employees per firm. Employment in the targeted industry clusters is projected to increase by 2.9 percent from 2006 to 2011. Jobs in the targeted clusters typically pay an above average wage. The average annual wage for all clusters in 2005 was \$51,285, compared to the state average of \$35,951. The Transportation/Logistics cluster is Missouri's largest employing cluster, followed by Finance, Agribusiness, and Information Technology.

### Targeted Industry Cluster Statistics<sup>10</sup>

<b><u>Transportation/Logistics</u></b> Statewide Employment (2006) = 175,064 Number of Employer Units (2006) = 12,468 Percent of Total Missouri Jobs (2006) = 7.62% Average Annual Wage (2005) = \$43,374 Projected Employment Change (06-'11) = 3.81%	<b><u>Finance</u></b> Statewide Employment (2006) = 132,036 Number of Employer Units (2006) = 9,769 Percent of Total Missouri Jobs (2006) = 5.75% Average Annual Wage (2005) = \$52,206 Projected Employment Change (06-'11) = 0.12%
<b><u>Agribusiness</u></b> Statewide Employment (2006) = 88,645 Number of Employer Units (2006) = 3,040 Percent of Total Missouri Jobs (2006) = 3.86% Average Annual Wage (2005) = \$39,605 Projected Employment Change (06-'11) = 1.03%	<b><u>Information Technology</u></b> Statewide Employment (2006) = 38,604 Number of Employer Units (2006) = 2,345 Percent of Total Missouri Jobs (2006) = 1.68% Average Annual Wage (2005) = \$70,938 Projected Employment Change (06-'11) = 9.25%
<b><u>Automotive</u></b> Statewide Employment (2006) = 36,223 Number of Employer Units (2006) = 258 Percent of Total Missouri Jobs (2006) = 1.58% Average Annual Wage (2005) = \$54,167 Projected Employment Change (06-'11) = -1.43%	<b><u>Life Sciences</u></b> Statewide Employment (2006) = 31,295 Number of Employer Units (2006) = 1,034 Percent of Total Missouri Jobs (2006) = 1.36% Average Annual Wage (2005) = \$66,505 Projected Employment Change (06-'11) = 11.41%
<b><u>Energy</u></b> Statewide Employment (2006) = 20,275 Number of Employer Units (2006) = 696 Percent of Total Missouri Jobs (2006) = 0.88% Average Annual Wage (2005) = \$58,053 Projected Employment Change (06-'11) = 1.72%	<b><u>Defense/Homeland Security</u></b> Statewide Employment (2006) = 16,922 Number of Employer Units (2006) = 348 Percent of Total Missouri Jobs (2006) = 0.74% Average Annual Wage (2005) = \$77,935 Projected Employment Change (06-'11) = 4.61%

### *METS Occupations in Targeted Industry Clusters*

Within each of the targeted industry clusters, there are a number of occupations that are specialized in terms of METS-related skills. Missouri has classified 49 different occupations to be METS occupations, or occupations that are math and science intensive, out of a total of 777 occupations.

Occupations are classified as mathematics or science intensive if the combined importance and level of mathematics or science skills needed to perform a particular job are two or more standard deviations above the mean mathematics or science skill level for all occupations. Skills refer to the developed capacities that facilitate learning and/or performance within occupations.<sup>11</sup> Top math/science intensive occupations within each of the eight targeted industry clusters are:

<b>Military, Defense, and Homeland Security</b> Computer Software Engineers, Applications Mechanical Engineers Aerospace Engineering & Operations Techs	<b>Information Technology</b> Computer Software Engineers, Applications Computer Software Engineers, Systems Computer Hardware Engineers
<b>Life Sciences</b> Chemists Medical Scientists Microbiologists	<b>Transportation/Logistics</b> Computer Software Engineers, Systems Mechanical Engineers Civil Engineers
<b>Energy</b> Mechanical Engineers Electronics Engineers Nuclear Engineers	<b>Automotive</b> Mechanical Engineers Computer Software Engineers, Applications Electronics Engineers
<b>Finance</b> Computer Software Engineers, Applications Computer Software Engineers, Systems Actuaries	<b>Agribusiness</b> Veterinarians Food Scientists and Technologists Agricultural Engineers

Source: MERIC

## Foundational Competencies

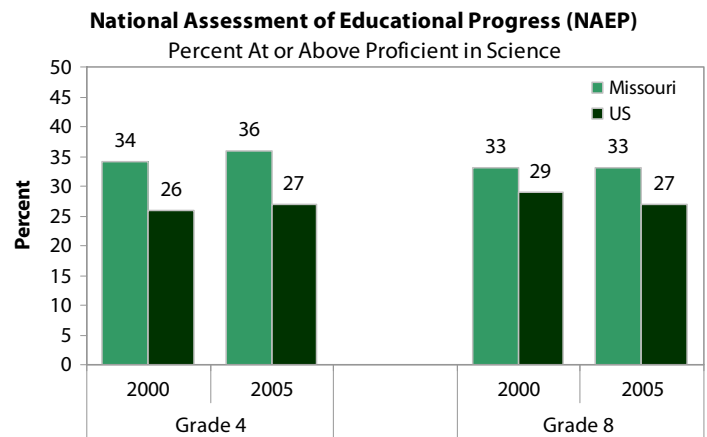
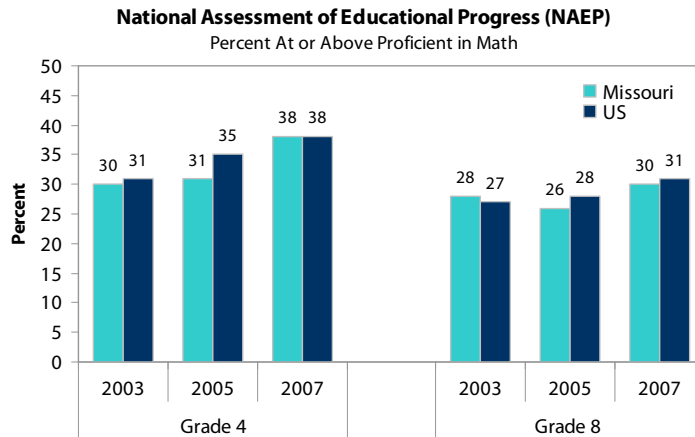
### *Personal Effectiveness Competencies*

Whether the focus is on new and emerging high tech occupations or on traditional occupations that require minimal training, the importance of soft skill development cannot be overlooked. Within the first tier of the competency pyramid, soft skills form the foundation of knowledge, skills, and abilities from which all other training and education is built. These personal effectiveness competencies are shown at the base of the pyramid because they are essential for all life roles—those as a member of a family, community, and of the larger society. Although they are not exclusive to the competencies needed for a successful career or roles in the workplace, they are highly valued by employers. These personal attributes include interpersonal skills, integrity, professionalism, initiative, dependability, and reliability.<sup>12</sup>

Regional groups made up of workforce, education, and economic development partners in the state have prioritized soft skill gaps as an issue that must be addressed.<sup>13</sup> By focusing on developing the soft skills of both emerging and current workers, each region can help to ensure that Missouri's workforce is prepared to meet the demands of tomorrow's employers.

## Academic Competencies

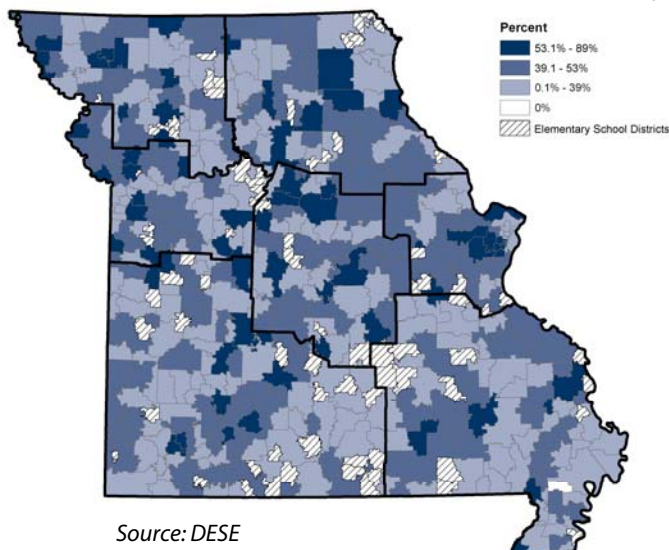
The percentage of Missouri students scoring at or above proficient<sup>14</sup> in math on the National Assessment of Educational Progress (NAEP) was in-line with the national average for both 4<sup>th</sup> and 8<sup>th</sup> grade in 2007. From Grade 4 to Grade 8, the percent of students at or above proficient in math declined. Missouri students scored better on the science assessments, above the national average and with more consistency between 4<sup>th</sup> and 8<sup>th</sup> grade.



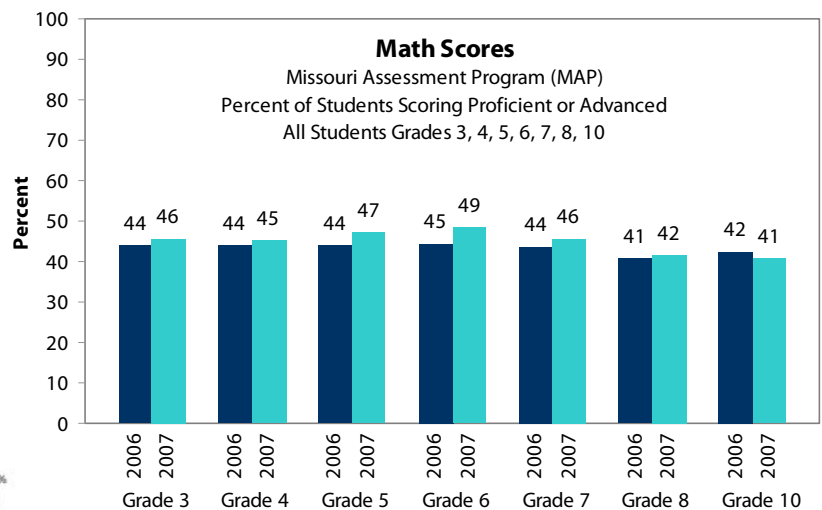
Source: National Center for Education Statistics

The percentage of Missouri students scoring at proficient and advanced levels on the Missouri Assessment Program (MAP) in math declines slightly from Grades 3 through 7 to Grades 8 and 10. However, the percentage increased from 2006 to 2007 in all tested grades except Grade 10 from 2006 to 2007.

### Missouri Assessment Program: Math Percent of 10<sup>th</sup> Grade Students Scoring Proficient or Advanced, 2007



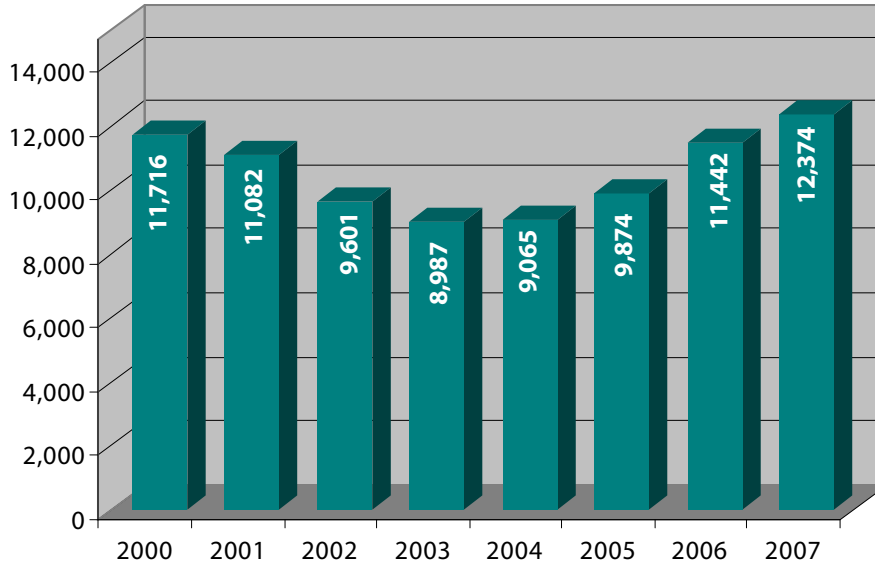
Source: DESE



Source: DESE

Levels of proficiency on the Math MAP for Grade 10 vary across the state and each Regional P-20 Network. District level scores ranged from 2.7 percent to 88.2 percent. Regionally, Network 4 had the highest average score at 46.1 percent, while Network 7 had the lowest average at 38.3 percent.

**Number of Dropouts in Missouri Public High Schools**



Source: DESE

From 2000 to 2003, the number of students dropping out as a percentage of total enrollments<sup>15</sup> for Missouri decreased from 4.5 percent to 3.3 percent. However, from 2003 to 2007 there has been a steady increase in the dropout rate with an increase of over 3,000 annual dropouts during that time period. Dropout rates for individual school districts range from zero dropouts to up to 21.8 percent in 2007.

The self-reported goals of Missouri students have a direct impact on high school retention and completion rates. Employment, military enlistment, and entry into

**Graduate Follow-up Data - Missouri**

	2002	2003	2004	2005	2006	2007
<b>2-Year College</b>	24.6%	25.5%	26.8%	26.5%	25.8%	25.6%
<b>4-Year College</b>	39.5%	39.6%	38.6%	38.2%	39.3%	39.4%
<b>Employment</b>	21.0%	20.0%	19.5%	19.7%	19.2%	18.8%
<b>Military</b>	3.6%	3.6%	3.4%	3.4%	3.1%	3.2%
<b>Career/Technical Schools</b>	3.9%	4.0%	4.1%	4.4%	4.3%	3.9%
<b>Other</b>	5.6%	3.6%	3.1%	2.9%	3.1%	2.8%
<b>Unknown</b>	0.3%	3.6%	4.6%	4.9%	5.2%	5.8%

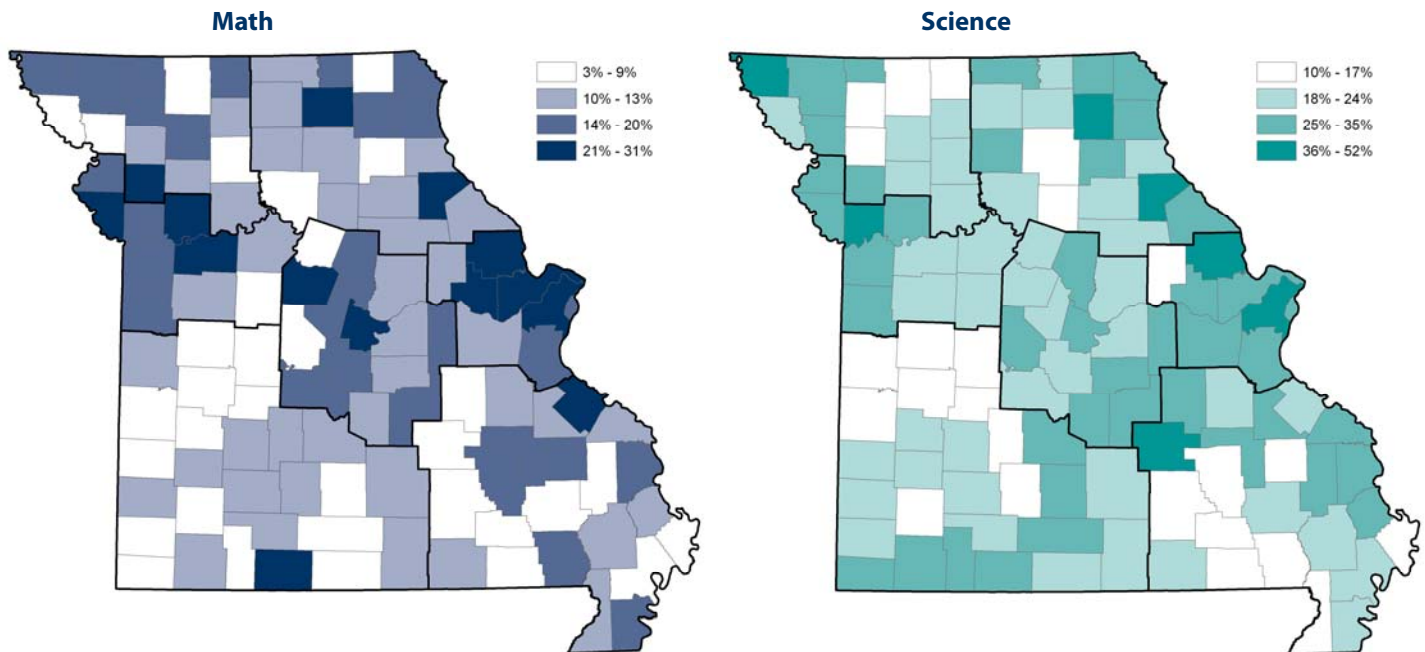
Source: DESE

postsecondary education are all indicators that high school students have positioned themselves to attain skills and knowledge through hands-on or formal settings.<sup>16</sup>

During the past 6 years, Missouri high school graduate follow-up surveys have shown stable levels of graduates entering four-year postsecondary institutions as well as those entering into career/technical schools. Employment has decreased from 21.0 percent in 2002 to 18.8 percent in 2007. From 2002 to 2007 there has been a small increase in the number of high school graduates entering two-year institutions which grew from 24.6 percent in 2002 to 25.6 percent in 2007. At least part of this growth can be attributed to the A+ Schools program, which provides eligible students with tuition and fees to attend Missouri public community colleges or area career centers.

Graduate goals vary across the state however, with some school districts reporting up to 88.4 percent of graduates entering a four-year college while others have more than 60 percent of graduates entering employment directly after high school.

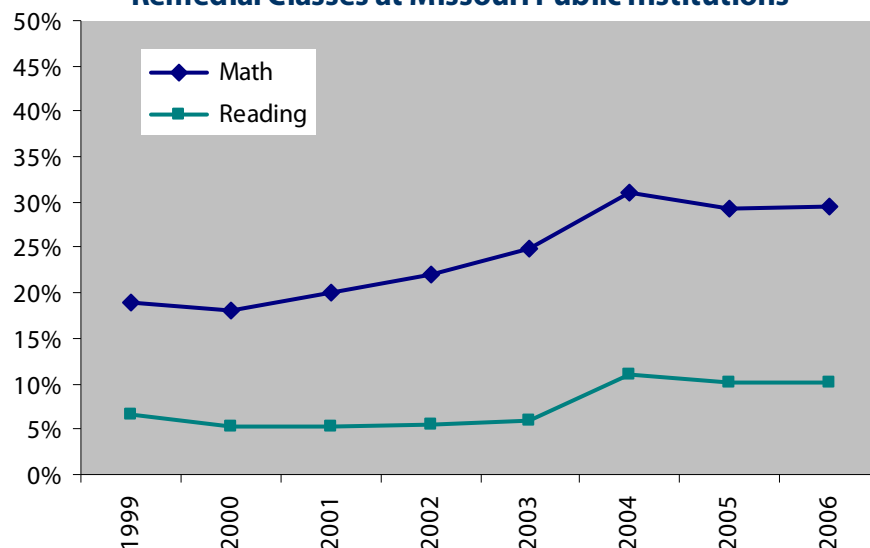
## Percentage of High School Students Enrolled in Advanced Math & Science Courses



Source: MERIC, DESE

Historically, levels of high school enrollment in advanced (Appendix E) math courses in Missouri have increased over the past ten years (3.0%). In 2007, Warren County (30.5%) had the highest percentage of advanced math enrollment while Shannon County (3.0%) had the lowest percentage. From 1997-2007 levels of high school enrollment in advanced science courses in Missouri have increased (4.4%). In 2007, St. Louis County (52.1%) had the highest percentage of advanced science enrollment while Dunklin County (10.3%) had the lowest.

## Percentage of First-time Freshman Enrolled in Remedial Classes at Missouri Public Institutions



Source: MDHE

From 1999 to 2006, the percentage of first-time freshman enrolled in remedial math and reading classes at Missouri Public Institutions has steadily increased.<sup>17</sup>

In 2004, percentages in remedial enrollment for both subjects reached their highest levels and have slightly declined in the last two years.

**P-20 Promising Practices:**Achievement First Program

Partnership for Regional Education Program in Kansas City (PREP-KC) is a successful educational intermediary organization that coordinates a number of promising initiatives to improved Kansas City's educational outcomes. The Achievement First (AF) in the Kansas City, Missouri School District has the following strategies:

- Small learning communities (SLCs) of students and adults. The same group of teachers stays with the same group of students for multiple years. In the high schools, the SLCs are organized around career themes. The themes are infused into core academic courses, and a thematic course of study is created and linked to post-secondary education and career paths.
- The Family Advocate System creates a bridge between the SLC and students' families. Each staff member in the school becomes an advocate for 15-17 students and their families, and stays with them through all of the years they are in that school. Advocates work closely with families on issues related to career and college preparation.
- Instructional Improvement becomes an intensive focus for teachers working together in their SLCs. All faculty members study and practice rigorous, standards-based instruction focused on actively engaging all students. These strategies and tactics are designed to increase student graduation and college attendance rates.

A+ Schools

While many Missourians see the A+ Schools Program as a scholarship program, it was created by the Outstanding Schools Act of 1993 as an incentive for improving Missouri's high schools. The primary goal of the A+ Schools Program is to ensure that all students who graduate from Missouri high schools are well prepared to pursue advanced education and employment. Participating high schools are encouraged to:

- reduce the dropout rate;
- raise academic expectations by eliminating general-track courses;
- provide career pathways for all students; and
- work closely with business and higher-education leaders to better prepare students for their lives after graduation.

Program data shows that A+ eligibility does correspond with lower remediation rates and stronger retention/persistence and completion at public institutions than non-A+-eligible students.

Project Lead the Way (PLTW)

PLTW is a not-for-profit organization that develops and promotes pre-engineering courses for high school and middle school students. PLTW has developed a four-year sequence of courses which, when combined with college preparatory mathematics and science courses in high school, introduces students to the scope, rigor, and discipline of engineering and engineering technology prior to entering college. The program is designed to attract more students to engineering careers; as well as promote greater success in collegiate programs at a time when the number of college graduates in math, science, and technology are decreasing in the nation. There are 130 Missouri secondary schools, colleges and universities participating in the program.



## Teacher Quality: The Tipping Point for Student Success

Research conducted at a state and national level has increasingly confirmed the importance of teacher quality for student achievement. Earlier work by the Missouri K-16 Task Force noted that the effect of low quality teachers on student achievement can persist for years and that high quality teachers can have a contrasting positive effect that lasts equally as long.<sup>18</sup> More recently, statistics reported by the Missouri Mathematics, Engineering, Technology, and Science (METS) Coalition state that there are twice as many certified teacher applicants in elementary education per opening as there are in math and science.<sup>19</sup> The 2006 METS report also noted that there is a higher rate of turnover for math and science teachers than that of all teachers in Missouri.

As Missouri moves forward with efforts to improve student achievement, quality teaching for critical skills becomes a vital issue for tomorrow's workforce. To meet the challenge of helping all students meet higher academic standards, even the best teachers may need to update their knowledge and skills. Further, many states are experiencing serious teacher shortages, especially in METS related subjects. Issues such as teacher recruitment, licensure and certification, and professional development impact the supply and retention of qualified teachers.

### Promising P-20 Practices:

#### Maryland's Alternative Teacher Certification Program

In 2003, the Maryland State Department of Education (MSDE) developed Maryland's Alternative Routes to Certification Options (MARCO) to tackle teacher shortages in that state. The state received a competitive "Transition to Teaching" grant from the U.S. Department of Education that provides \$2 million over five years to create innovative approaches for both the recruitment and training of college graduates and highly qualified mid-career changers. MARCO partners the State Department of Education, two higher education institutions, and a local school system in a unique blend of services including online coursework to MARCO participants. Those who complete the program receive nine graduate credit hours that may be rolled into a master's degree. MARCO participants receive Resident Teacher Certification on the first day of school and are guaranteed positions as teachers in the system.

#### Texas' Education Accountability System

Since 1997 the Texas State Board for Educator Certification has implemented a performance-based Accountability System for Educator Preparation (ASEP). Under this system, teacher preparation programs are held accountable for the performance of the students that they graduate. The state board issues annual accreditation ratings based on the percentage of each class of graduates passing the state certification tests. Accountability policies for teacher certification programs in the state ensure that teacher certification programs are rigorous and that Texas educators are capable of providing quality instruction.

## Advanced Competencies

Measures of completions in degree programs are one way of estimating the levels of advanced competencies in Missouri's current and future workforce. Overall completions in Missouri have increased 15.8 percent from 2002 to 2006, but all award levels which have grown at a greater than average rate are post baccalaureate or graduate degrees, with the exception of the associate's degree (28.7 percent increase).

- Statewide, baccalaureate degrees have increased by 11.7 percent.
- Postsecondary vocational training has increased by 2.3 percent overall.

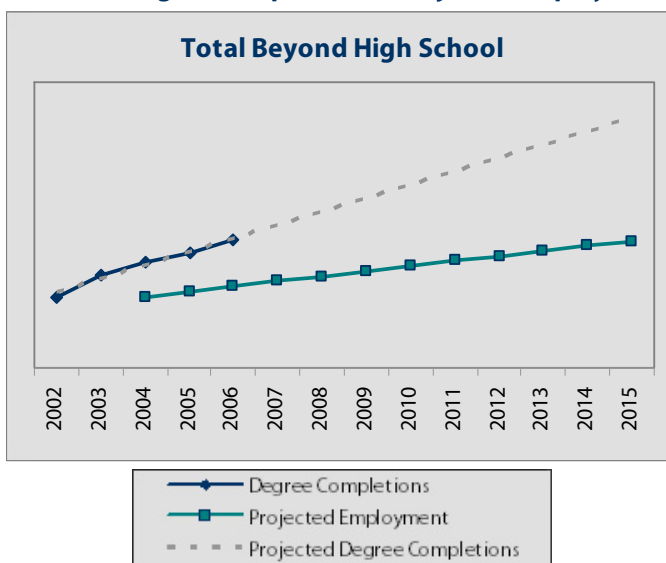
### Gap Analysis Assumptions

This analysis of occupational supply versus demand determines how many completers by degree level will be necessary to fill projected jobs if those jobs are to be filled with "home-grown" talent. Because of the focus on "home-grown" talent, it was assumed that all completers remain in Missouri for work and adjustments were not made to account for possible in-migration of talent.

For degree programs associated with METS occupations, the number of completions has increased 11.2 percent from 2002-2006, slower than overall completion growth. For METS related degree programs<sup>20</sup> completions have increased by 4.1 percent from 2002 – 2006; consequently, the percentage of METS completions of overall awards has declined from 29.9 percent to 26.9 percent during that period.

- Doctoral degrees in METS degree programs have increased 42.2 percent from 2002-2006, and post baccalaureate certificates have more than doubled, although overall numbers of post baccalaureate certificates are still relatively few (161 in 2006).
- With the exception of one-two year and two-four year certificates, METS awards at all other levels have grown, although at rates below the overall state increase (15.8 percent).

### Missouri Degree Completions & Projected Employment



### Mapping Future Training Gaps

In order to determine future gaps in advanced competencies, it is necessary to compare trends in both supply (degree completions) and demand (projected employment). Index numbers are used here to indicate relative change in supply and demand, particularly over time. They are especially useful when comparing values where the magnitudes are significantly different. To better compare, a base level for both supply and demand is arbitrarily set at 100, and values are represented as a percentage of that base value. (Index numbers for each year are calculated by dividing the actual value by the base year of data and multiplying by 100.)

The lines on each chart represent the rate of growth for degree completions from 2002-2006 and the projected employment growth from 2004-2015 by degree level. A similar rate of growth (or slope of the line) would suggest that there may be sufficient degrees added each year to match the growth in the number of jobs requiring those degrees.

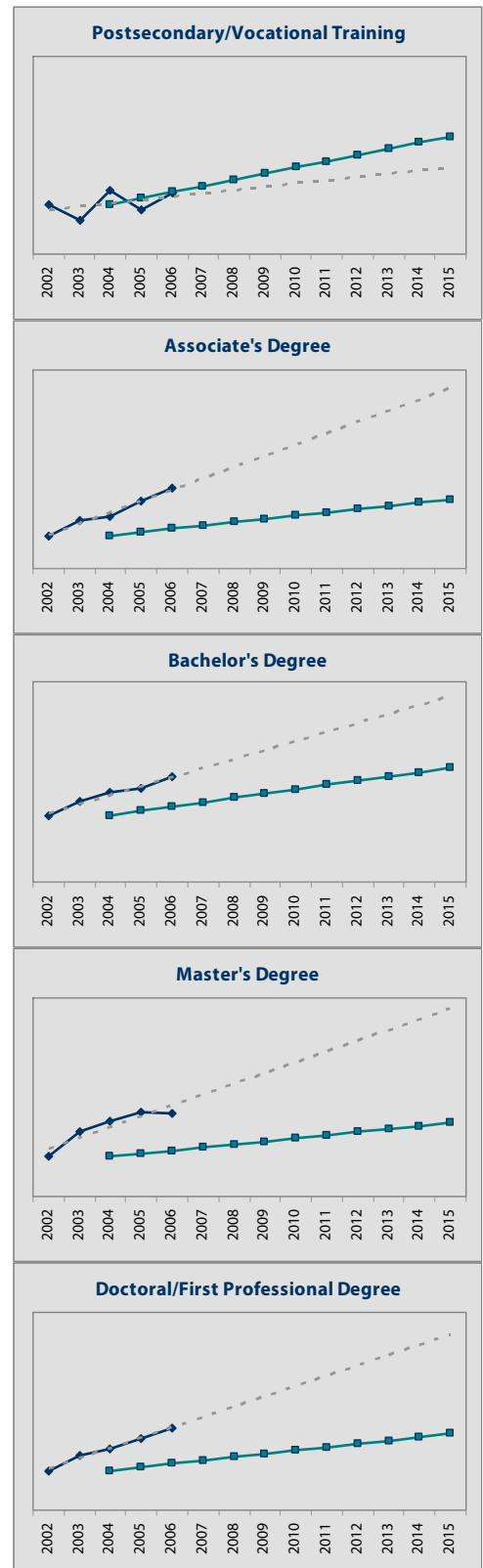
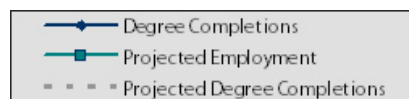
The projected degree completions line is a simple linear trendline based on the 2002-2006 degree completions data. Its purpose is to visually assist in the comparison to projected employment, not to attempt to project the number of completions in any degree program. A single peak or dip in the completions trend could greatly affect the magnitude and direction of the line.

In terms of overall supply versus demand for the state:

- The trends in growth for completions in both Postsecondary/Vocational training and baccalaureate training closely match trends in employment growth for occupations that typically require those training levels.
- Growth trends for completions in Associate's, Master's, and Doctoral/First professional degrees are somewhat higher than the growth in employment for occupations that typically require those types of training.
- Across all types of training beyond high school, Missouri is more likely to face an excess supply of workers for the projected demand in employment, assuming that the current mix of occupations in Missouri is similar in 2015.

However, this analysis is not able to determine changes in demand for advanced competencies for emerging occupations not already included in current employment estimates nor for skills sets that will change for occupations as their related tasks become more advanced and technical. Both of these factors could affect future demand.

Further, although the data shows that **quantities** of degreed professionals may be sufficient to meet overall occupational demand in Missouri in the coming years, evidence suggests that there are significant gaps in **quality**.



Source: MERIC, MDHE

**P-20 Promising Practices:**Bright Flight Scholarship

Bright Flight is a merit-based scholarship in the amount of \$2,000 per annum to Missouri's qualifying graduating high school seniors who enroll in a Missouri accredited college or university. From June 2004 to July 2005, 8,390 students were enrolled in the Bright Flight program, which totaled over \$15 million in state expenditures. To qualify for Bright Flight, a student must be in the top 3 percent of his or her state-wide high school class as determined by normalized tests, the ACT and SAT composite scores.

To date, a score of 31 or above on the ACT or an SAT-equivalent score qualifies. A score of 31 will be needed to qualify for the 2008-2009 school year. Students must maintain at least a 2.5 GPA in college and full-time student status to renew the scholarship, which can be renewed for up to five years for a maximum compensation of \$10,000. Bright Flight students must attend school continuously, that is, they cannot cease attending school unless they worked for a non-profit organization or held a government job/served for the armed services. Academic interruption must not exceed 20 months.

Curriculum Alignment Initiative (CAI)

The work of the CAI is part of MDHE strategy to increase participation in higher education and to smooth pathways for students entering into and progressing in higher education. The goal of this work is to improve the college readiness of students throughout Missouri, by clearly articulating to high school students what it means to be college ready, and to smooth transfer of entry-level collegiate courses. CAI is mandated by Senate Bill 389 (2007) and directs public colleges and universities to work with the CBHE to develop entry- and exit-level competencies for entry level collegiate coursework.

Access Missouri

With Access Missouri, the state has substantially increased its level of effort and re-focused the state's need based financial assistance programs in order to improve the financial access of Missouri's lower and middle income families to the postsecondary education options they need. The state has championed additional funding for such programs, increasing the amount available from \$27M to \$72M, and implemented a new program that is serving more than 35,000 students, an increase of more than 100 percent from FY 2007.

## Retraining the Adult Workforce

Although focusing on formal education is important to develop talent in younger populations, it is equally important to address talent development in Missouri's adult population. Over half of Missouri's 2025 workforce is already in the workforce today. However, many are performing jobs that, due to the rapidly changing economy, will no longer exist or be significantly different twenty years from now. This presents a challenge in ensuring a skilled workforce able to perform the tasks of jobs that don't exist, meaning our current workforce must improve its competencies necessary to succeed in targeted, emerging industries. Some of these shortages are being addressed through the retooling of Missouri's public workforce system as well as with Missouri community colleges and career and technical centers. In the years ahead, Missouri will need to create many new learning pathways to meet the needs of a non-traditional workforce in need of more relevant skills to be competitive.

### **P-20 Promising Practices:**

#### Missouri Career Readiness Certificate (MoCRC)

The MoCRC was created to assess and demonstrate an individual's competencies in three core areas – applied mathematics, reading comprehension, and locating information – necessary for proficiency in today's workplace. The benefit of the MoCRC is two-fold. The certificate allows businesses to identify potential employees that possess competencies in the skills needed to perform the jobs that make their businesses successful. Additionally, the certificate allows individuals to assess their competencies, and those wishing to improve their assessment scores are provided training through the Worldwide Interactive Network (WIN) system. To date, over 9,000 Missourians have received a MoCRC. Local Workforce Boards are planning to issue over 25,000 MoCRCs in 2008.

#### Skilled Workforce Initiative (SWI)

The SWI was instituted in 2005 to allow Local Workforce Boards to work with business and education stakeholders to identify solutions aimed at root causes to talent development problems (technical skills, soft skills, career awareness, entrepreneurship, etc.) in industries that drive Missouri's economy. Competitive applications are solicited in four areas: Talent Acquisition and Development, Entrepreneurial Training and Support, One-Stop Career Center, and Business Retention. To date, over \$12 million has been invested to assist businesses, improve infrastructure, and train over 13,500 Missourians.

#### Business and Industry Training Programs

Missouri ranks 8th nationally in per capita investments made in industry training programs available for eligible businesses to train workers for the purposes of job creation and job retention. These programs are operated by local educational agencies (LEAs). The Missouri Job Development Fund is DED's funding source for the Missouri Customized Training Program. This program allows the state to provide training to new and expanding businesses. Funding is also used to retrain employees of existing businesses to retain businesses through both direct training and increasing employee skills. The Missouri Community College New Jobs Training Program provides an incentive for the creation of new jobs by providing education and training of workers for new or expanding industries. In FY 2007, 213 companies were served in all three programs, employing over 32,899 Missourians with an average wage of \$18.86/hour.

## The Right Skills for the Right Jobs in the Right Places

### *Regional Skills Gaps*

While statewide higher education completers data suggest that the projections for quantities of degreed professionals is sufficient to meet occupational demand in the coming years, evidence suggests that there are significant gaps in quality and relevance of skills in math and science intensive occupations in regions throughout the state.

A 2004 study *Survey of Job Openings in the St. Louis MSA- Information Technology-Producing Sector* completed by the Public Policy Research Center at UM-St. Louis surveyed IT-producing employers and noted that the greatest challenge to their continued growth cited by employers was the availability of qualified labor. Only 62.8 percent of employers found applicants to match “well” or “very well” to the skills requirements listed for job openings. The survey of IT employers found 581 job openings in St. Louis County, City of St. Louis, and St. Charles County in May 2006 with the highest demand on occupations in custom computer programming services such as software engineers, computer systems analysts, and computer system programmers.

A 2006 industry survey by the Kansas City Life Sciences Institute suggests that there are no current workforce issues with 86 percent of life science firms able to fill their average vacancy in less than 60 days and only a small percentage of firms (10 percent) regularly recruit talent from outside of the region.<sup>21</sup> However, the same survey data suggests that many area life sciences firms are projecting employment growth over the next three years. This comes at a time when math and science degree attainment is lagging.

While data from an industry survey analysis by the Missouri Hospital Association suggests that vacancy and turnover rates in the health professions have been leveling or declining from 2001-2006, it also projects that there will continue to be shortages in many skilled health care professions, such as physical therapists, radiological technicians, and registered nurses.<sup>22</sup> Much work needs to occur at the regional level to address specific gaps in basic and advanced competencies to ensure that Missourians have the right talent and fit for future occupational demand.

### *Think Globally, Act Regionally*

Global competition, a 21st century economic reality, is typically seen as a national challenge, but the front lines of the battlefield are regional, where companies, workers, researchers, entrepreneurs, educators, and government come together to create a competitive advantage. To that end, Missouri recognizes that regional economies are not limited to the invisible geopolitical boundaries and emphasizes the need for collaboration and cooperation to address the needs of business and industry. Regional industry, occupation, and education data are being provided later in this report to encourage P-20 Networks to convene regional summits to raise awareness and address the issues raised in this report. The networking of all regional assets (e.g. P-20 education, philanthropic, business, and economic development) toward common goals has proven to be a successful strategy for the nation’s most economically competitive regions.<sup>23</sup> The regional networks (Appendix F) are being identified as a starting point for gathering data and convening initial business-education summits.



## Talent Recruitment and Retention

The key to Missouri's future economic competitiveness lies not just in its ability to provide Missourians with relevant education and training offerings throughout the education continuum, but also to be an attractive option to retain them and to recruit talent from other locales. The emigration of young, talented, and degreed individuals to other locales due to lack of opportunity, want for a better lifestyle, or other like reasons, is a critical issue when addressing possible workforce gaps in Missouri.

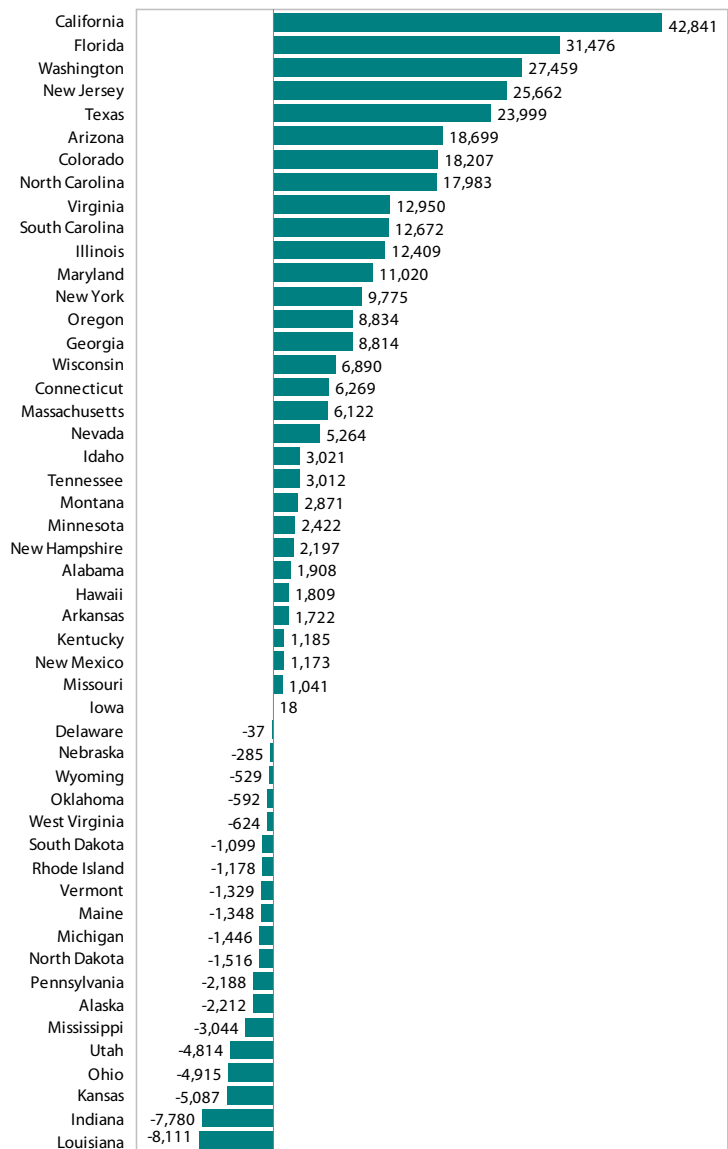
Cities that experience a net gain of these 'best and brightest', typically aged 25 to 34, may look forward to an improving and developing economy. A review of recent data from the National Center for Higher Education Management Systems (NCHEMS) Information Center show an improvement of the in-flow of Bachelor's Degrees, but still a slight decrease in Doctoral Degrees.<sup>24</sup> These following graphs show analysis of U.S. Census data from the 2005 American Community Survey.

This combined research suggests that while Missouri is experiencing a net inflow of degreed professionals, it lags behind many other states in its ability to attract and retain talent.

### *What Are Graduates Looking For*

A number of 'Young and the Restless' studies have recently been developed to track where 25 to 34 year old college graduates are moving and why. This critical demographic of well-educated, highly mobile, hard working, and adaptable professionals is also decreasing in size, leaving a smaller pool of creative minds from which cities may draw.

**Net Migration of Degreed Professionals**  
Aged 22-39 with Bachelor's Degrees or higher



Source: NCHEMS, U.S. Census Bureau, 2005 American Community Survey

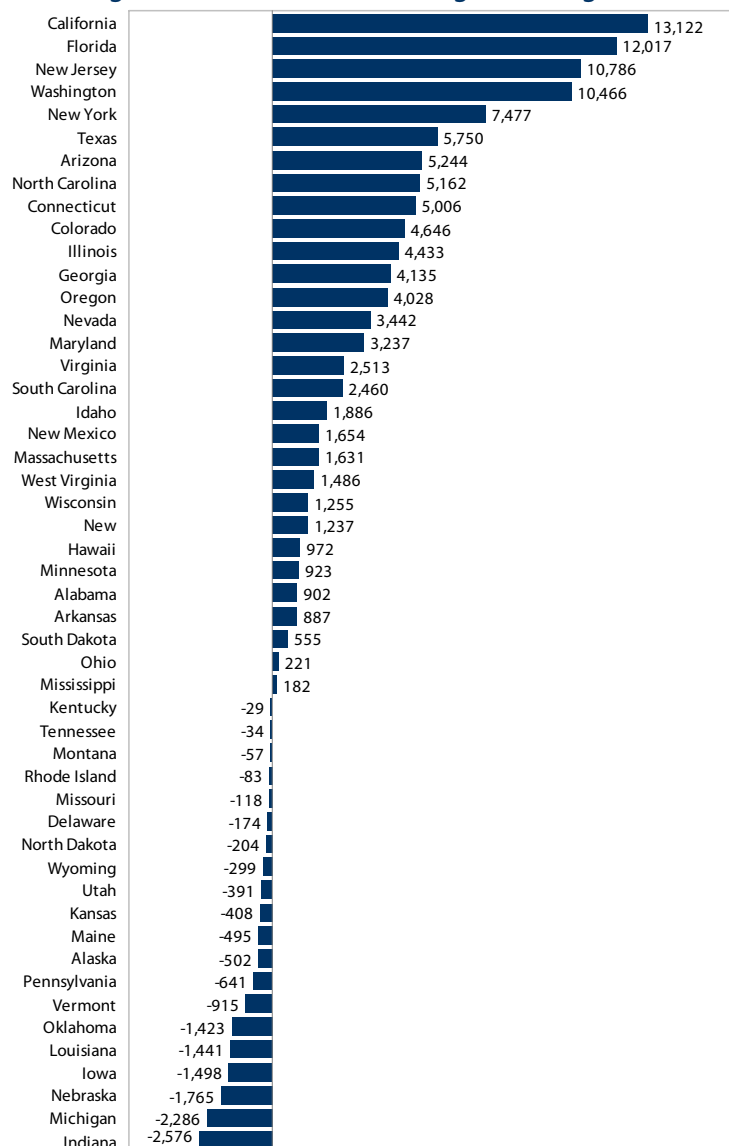
As the population decline in the 25 to 34 age group becomes more evident, communities will be competing with one another to attract qualified individuals to fill empty positions that the 'Baby Boomers' vacate due to retirement. A key factor in attracting these individuals is ample job opportunities with appropriate pay.

However, other important factors sometimes outweigh compensation with this age group. This demographic is looking for an active nightlife and wants to be surrounded by people their own age, especially if they are single. Many college towns have the right mix of features that young, educated adults are seeking. However, the lack of jobs in non-metro college towns means recent graduates have to move elsewhere for employment opportunities.

Missouri has a few examples of cities that are creating an attractive environment for this crucial demographic, such as the recent developments in Kansas City and St. Louis. Downtown St. Louis and Kansas City rebuilding efforts will likely attract this group if there are jobs available. After all, Kansas City and St. Louis have great entertainment options, a variety of culinary experiences, and were designated with ranks of No. 37 and No. 14, respectively, in Forbes's recent article 'Best Cities for Young Professionals'.<sup>25</sup>

In addition, several smaller cities like Cape Girardeau, Jefferson City, and Branson are working on a smaller scale to be more marketable to young professionals. They are ranked in the top 2.5 percent of all non-metro towns nationally in addressing quality of life issues.<sup>26</sup>

**Net Migration of Degreed Professionals  
Aged 22-39 with Graduate Degrees or higher**



Source: NCHEMS, U.S. Census Bureau, 2005 American Community Survey

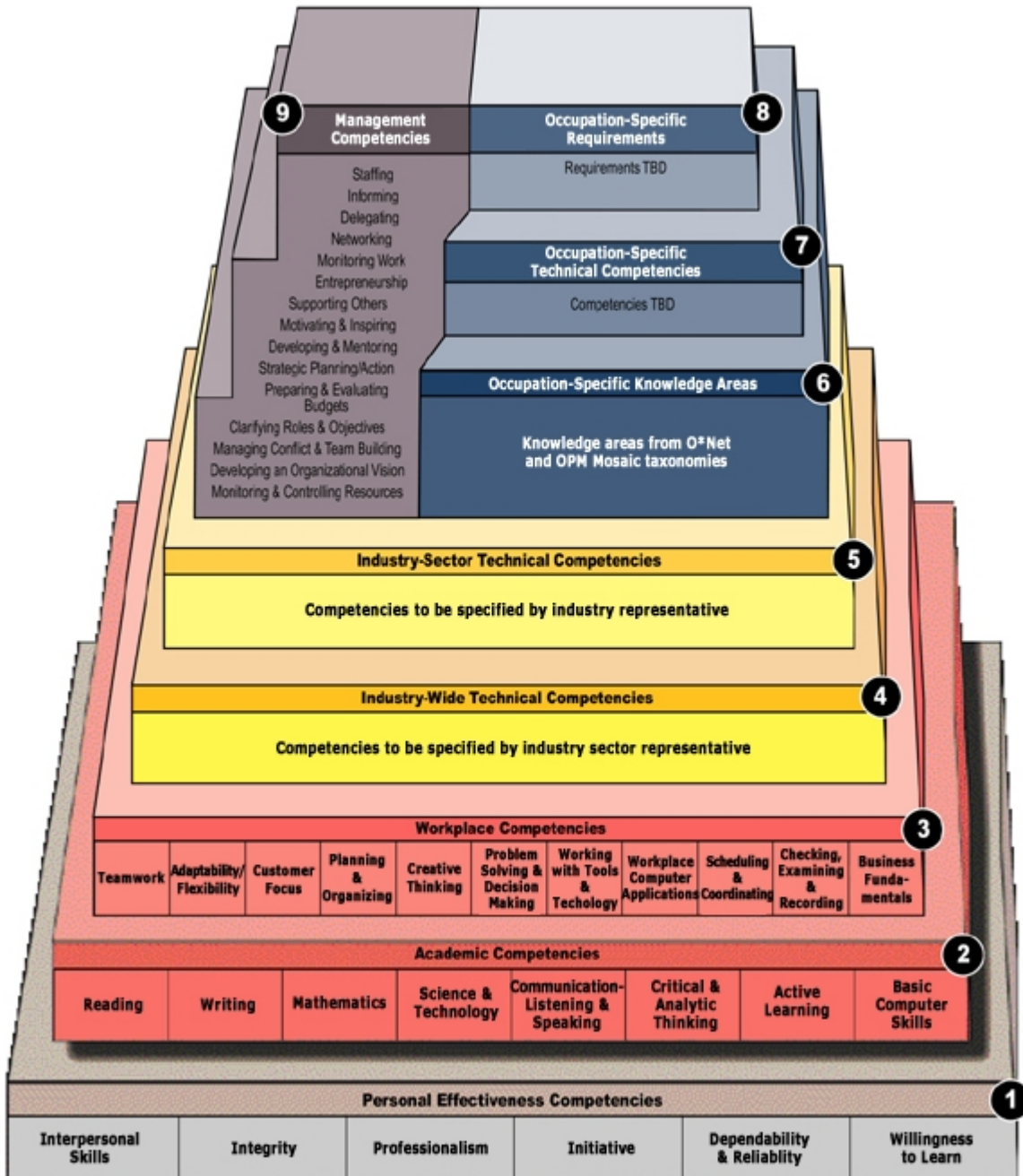
## Conclusion

In the 2025 economy, Missouri will be more than a state that consumes its share of high-technology goods and services; it will be a national leader in the creation of high-tech innovations that drive high-wage jobs and improved quality of life for all Missourians. This will require that we re-double our efforts to create an education advantage to go with our many assets, including our pro-business climate, quality communities, and enviable geographic and regional advantages. While it is impossible to accurately predict future workforce supply and demand in an innovation economy, the findings and analysis in this report should serve as a blueprint for state and local leaders across all sectors – public, private and not-for-profit. If Missouri is to reap the rewards that are awaiting those who embrace a culture of lifelong learning, we must come together as a state to rally around key education and workforce strategies that will place Missouri at the forefront of an economic transformation unlike any other in its rich history. These strategies should focus on:

- Regional summits to raise awareness, network assets, plan, and act locally to improve the quality and relevance of education and training to ensure that Missourians have the right talent and fit for family-supporting jobs specific to those regions.
- A continued emphasis on implementing the METS recommendations to ensure that P-20 education in Missouri is preparing a critical mass of students for high-wage math and science intensive occupations of the future.
- Forging greater collaboration among state departments responsible for K-12, higher education, and economic development to improve vertical alignment from one educational level to the next as well as horizontal alignment with future business and industry demand.
- A continued emphasis on targeting high-technology industry clusters in a coordinated fashion to address their specific needs, including the need for a sustainable pipeline of well-educated, highly-skilled workers.
- Maximizing community assets to improve Missouri's attractiveness to young degreed professionals, both home-grown and those recruited from other locales.
- A continued retooling of adult workforce programs to ensure that flexible opportunities for relevant skill development are available to current workers who are projected to makeup over half of the 2025 workforce and who will need to continuously learn, unlearn, and relearn 21<sup>st</sup> century competencies.
- Recognizing that significant numbers of Missouri's workers are aging and working beyond normal retirement age. Adult retraining offerings will need to be flexible enough to accommodate those mature workers who choose to reinvent themselves for new careers.
- Recognizing that Missouri's emergent workforce is becoming increasingly more diverse and in need of robust strategies to provide services for individuals with English as a second language.

## Appendix A

## U.S. Department of Labor Industry Competency Model



## Appendix B

### **METS Alliance Report to Governor Blunt – August 31, 2006**

#### **Executive Summary**

The importance of mathematics, engineering, technology, and science (METS) to the future well-being of Missouri and the nation was firmly established at Governor Blunt's METS Summit held on April 25, 2006. Post Summit activities include the formation of a METS Alliance and the development of a preschool through graduate level (P-20) action plan organized around five major goals:

- Improve the performance of all P-20 students;
- Expand the pool of students motivated to pursue METS careers;
- Expand the pool of Missouri's P-20 METS educators;
- Establish a technology plan to support METS curricula, Missouri Grade Level Expectations (GLEs) and assessments in Missouri;
- Increase public awareness of the value of METS knowledge on the lives of all Missourians and highlight the importance of METS-related industries and jobs in enhancing Missouri's global competitiveness and innovation.

The METS Alliance created a strategic plan outlining how Missouri could begin to address the needs identified at the Summit. The first step the Alliance took was to recommend establishing a METS Coalition to focus on this crucial statewide priority and increase the likelihood of Missouri's long-term success in executing its METS action plan. The METS Coalition will be comprised of key business, education, and government leaders who will regularly promote, monitor, and evaluate the success of Missouri's P-20 METS initiatives. Through broad-based collaboration, the METS Coalition will seek to increase the collective impact of the independent efforts of many individuals and groups.

## Appendix C

## Missouri's Top 30 Employing Occupations

SOC	Occupation	Rank 2015	Rank 2004	Change in Rank	2004 Estimated Emp	2015 Projected Emp
41-2031	Retail Salespersons	1	1	0	92,410	106,780
43-9061	Office Clerks, General	2	2	0	85,270	88,870
41-2011	Cashiers	3	3	0	77,820	76,550
29-1111	Registered Nurses	4	5	1	53,110	66,400
35-3021	Combined Food Prep & Serving Workers, Inc. Fast Food	5	4	-1	56,720	64,690
35-3031	Waiters & Waitresses	6	6	0	52,140	58,420
37-2011	Janitors & Cleaners, Except Maids & Housekeeping Cleaners	7	7	0	47,750	54,800
31-1012	Nursing Aides, Orderlies, & Attendants	8	11	3	40,540	49,140
53-3032	Truck Drivers, Heavy & Tractor-Trailer	9	9	0	44,290	47,630
43-4051	Customer Service Representatives	10	12	2	40,190	47,260
53-7062	Laborers & Freight, Stock, & Material Movers	11	10	-1	42,080	42,940
11-9012	Farmers & Ranchers	12	8	-4	45,590	42,820
51-2092	Team Assemblers	13	14	1	39,360	41,230
47-2031	Carpenters	14	15	1	34,960	40,240
43-3031	Bookkeeping, Accounting, & Auditing Clerks	15	13	-2	39,710	39,700
25-2021	Elementary School Teachers, Except Special Education	16	22	6	28,540	33,710
49-9042	Maintenance & Repair Workers, General	17	16	-1	30,180	33,590
41-4012	Sales Representatives, Whls & Manu, Except Tech & Sci.	18	18	0	29,850	32,980
11-1021	General & Operations Managers	19	20	1	29,140	32,820
37-2012	Maids & Housekeeping Cleaners	20	19	-1	29,820	31,400
13-2011	Accountants & Auditors	21	24	3	26,630	29,270
43-6011	Executive Secretaries & Administrative Assistants	22	23	1	27,540	29,250
39-9011	Child Care Workers	23	25	2	26,110	27,970
43-6014	Secretaries, Except Legal, Medical, & Executive	24	17	-7	30,090	27,630
43-5081	Stock Clerks & Order Fillers	25	21	-4	28,730	25,980
25-2031	Secondary School Teachers, Except Special & Voc Edu	26	28	2	22,110	25,440
41-1011	First-Line Supervisors/Managers of Retail Sales Workers	27	26	-1	24,940	25,260
43-4171	Receptionists & Information Clerks	28	29	1	21,200	24,430
43-1011	First-Line Supervisors/Mgrs of Admin Support Workers	29	27	-2	23,050	23,840
39-9021	Personal & Home Care Aides	30	40	10	16,870	22,290

Source: MERIC Long-Term Occupation Projections, 2004-2015



*Appendix D*

The Agribusiness cluster is comprised of industries supporting farm production (animal and crop), farm-related industries, and indirect agribusiness. Farming and supporting industries which provide input, processing, management, and marketing comprise the core elements of this cluster. Pesticide and fertilizer production companies are the largest employer in this cluster.

The Automotive cluster is comprised of industries involved in the manufacturing of motor vehicles, such as buses, cars, and trailer trucks. This also includes the manufacturing of new and after-market parts for use in motor vehicles. The largest employing areas in the automotive cluster are located in the St. Louis and Kansas City metropolitan areas, and Greene County.

The Energy cluster is defined by industries involved in the operation of power facilities and the manufacturing of machinery and parts used in the production of energy. The demand for alternative fuel sources, like ethanol and biodiesel, will help drive growth in this cluster.

The Finance cluster focuses on industries engaged in the transfer, holding, and investment of money. These include Banking, Investment and Financing, Insurance, and Tax Preparations. Much of this industry is concentrated in the St. Louis, Kansas City, and Springfield areas.

The Information Technology cluster is comprised of industries involved in the manufacturing of electronic components used in computers, communication devices, and other electronic devices. This cluster also includes planning and design of computer systems, software development, management consulting services, and research. Wired telecommunications is the top employer in this cluster. Going forward, five of the ten fastest growing occupations in Missouri are projected to be related to Information Technology.

The Life Sciences cluster focuses on industries involved in the enhancement of quality of life through psychosocial, biological, medical research, and engineering. It is also comprised of chemical and medical device manufacturing. This is one of the state's best known targeted industry clusters, with a concentration of Life Sciences along Interstate 70 stretching from Kansas City to St. Louis.

The Defense and Homeland Security cluster is comprised of industries that supply and support local and national security. Included are defense-related research activities and the manufacturing of communications equipment, ammunition, military vehicles, and aircraft/aerospace components. The state's two main military bases, Fort Leonard Wood and Whiteman Air Force Base, have attracted a variety of private defense and aerospace companies to Missouri.

The Transportation and Logistics cluster focuses on the support processes involved with the transfer of products and services. This cluster is comprised of Wholesalers, Logistical Services, Shipping Containers, Warehousing, Local Haulers, and Interstate/International Haulers. Missouri's central location, with access to highways, rail, waterways, and airports, make it a cost-effective place from which to ship and a natural place through which products are transported.

## Appendix E

**Missouri - Advanced Math and Science Courses**

The following courses/course codes have been designated “Advanced Courses” for Math and Science by the Missouri School Improvement Program (MSIP). These are the courses that are used to evaluate MSIP Performance Standard 9.4.1. These courses are considered advanced because they are over and above the courses required for graduation. It is assumed that the content of the courses, in general, is at a level suitable for juniors and seniors who are preparing for postsecondary education or training.

**Math**

<i>Course Code</i>	<i>Course Name</i>
115861	Algebra-Trigonometry
115865	Analytical Geometry
115866	Calculus
115840	Mathematical Analysis
115875	Probability and Statistics
115860	Trigonometry

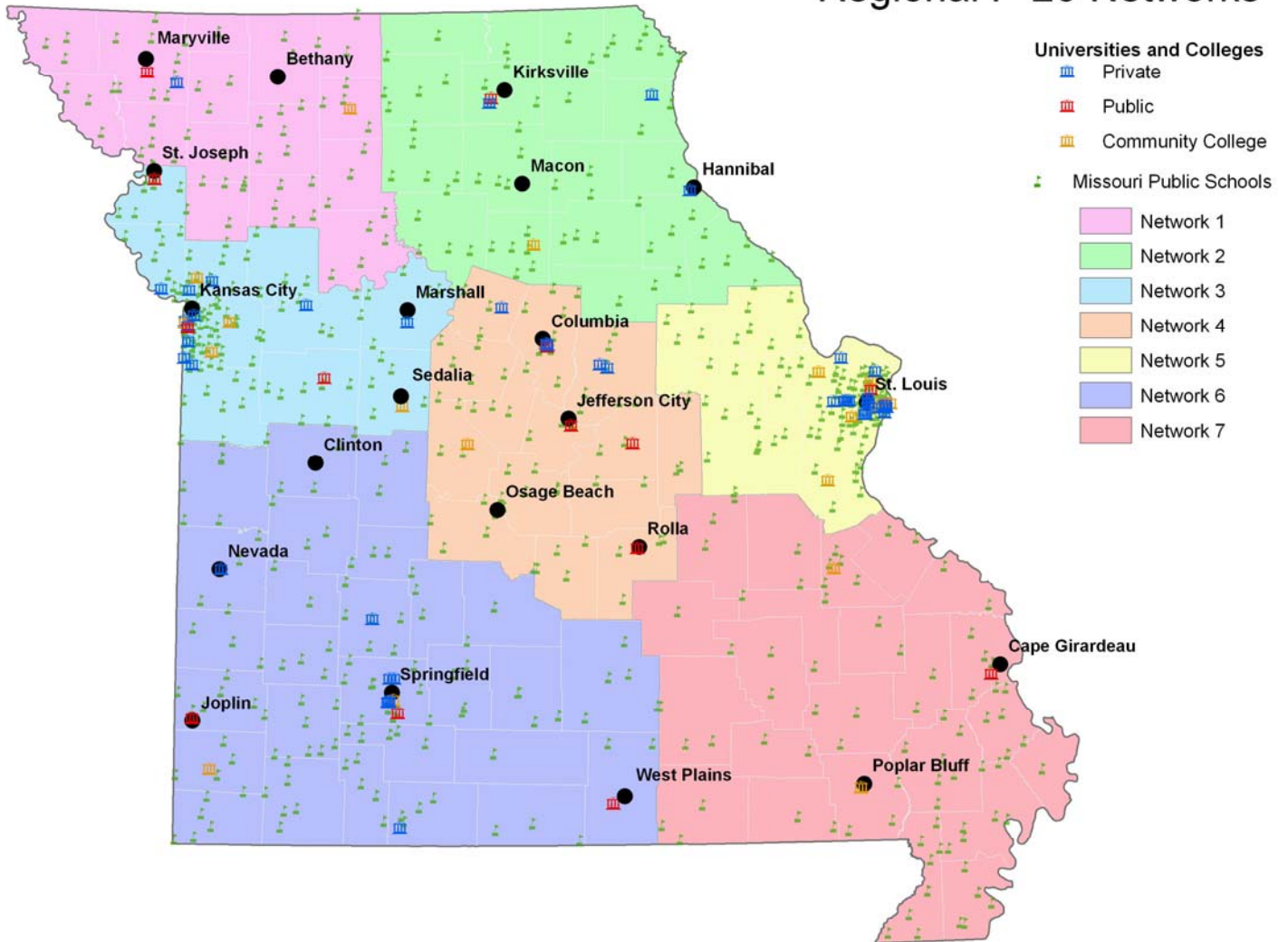
**Science**

<i>Course Code</i>	<i>Course Name</i>
133810	Astronomy
134210	Botany
134600	Chemistry
133820	Geology
135900	Physics
134221	Physiology & Anatomy
135910	Principles of Technology
134220	Zoology

*Source: DESE, Missouri School Improvement Program*

## Appendix F

### Regional P-20 Networks



- <sup>1</sup> *A Call to Action for Missouri, Mathematics, Engineering, Technology and Science in Missouri*, 2005
- <sup>2</sup> *Missouri Gateway Skills Report 2007*, MERIC
- <sup>3</sup> *Baby Boomers Envision Retirement II: Survey of Baby Boomers' Expectations for Retirement 2004*, AARP.
- <sup>4</sup> Schlosser, F., Templer, A., & Ghanam, D. *How Human Resource Outsourcing Affects Organizational Learning in the Knowledge Economy*. *Journal of Labor Research*, 27(3), 2006, pp.291-303.
- <sup>5</sup> U.S. Department of Labor, Employment and Training Administration. (2005) *Workforce Innovation in Regional Economic Development (WIRED) Initiative*. Retrieved from <http://www.doleta.gov/WIRED/>.
- <sup>6</sup> *Looking to the Future: Missouri's Targeted Industry Clusters*, Missouri Economic Research and Information Center.
- <sup>7</sup> *Technical Assistance Guide For Developing and Using Competency Models – One Solution For a Demand-Driven Workforce System*, U.S. Department of Labor – Employment and Training Administration.
- <sup>8</sup> *State Populations Rankings Summary*, U.S. Bureau of the Census - Population Division.
- <sup>9</sup> *New and Emerging (N & E) Occupations*. <http://www.onetcenter.org/taxonomy.html>.
- <sup>10</sup> *Looking to the Future: Missouri Targeted Industry Clusters*. MERIC. May 2007.
- <sup>11</sup> *Gateway Skills 2007: Mathematics and Science Intensive Occupations*, MERIC
- <sup>12</sup> *Industry Competency Model*, U.S. Department of Labor – Employment and Training Administration.
- <sup>13</sup> *Missouri Skilled Workforce Initiatives, 2005-2007*.
- <sup>14</sup> Advanced: above grade level; Proficient: at grade level; Basic: below grade level, not passing; Below Basic: inadequate.
- <sup>15</sup> High school dropout rate is the number of dropouts divided by (September enrollment plus transfers in minus transfers out minus dropouts added to total September enrollment then divided by two (2)).
- <sup>16</sup> DESE Strategic Plan - 2007.
- <sup>17</sup> The report was based on all Missouri public high school seniors who graduated in the spring and entered Missouri public colleges and universities in fall of that same year.
- <sup>18</sup> *Achievement Gap Elimination: Report of the Missouri K-16 Task Force*. Missouri K-16 Task Force, 2001.
- <sup>19</sup> *Making Missouri a National Leader in Mathematics, Engineering, Technology, and Science*. Missouri METS Coalition, 2006.
- <sup>20</sup> METS program completions were assigned according to CIP codes eligible for federal Academic Competitiveness / SMART grants, with the exception of critical languages, and with the addition of other six-digit CIPs as appropriate (the full list is available upon request).
- <sup>21</sup> *Regional Life Sciences Census*. Kansas City Area Life Sciences Institute, Inc., 2006.
- <sup>22</sup> *MHA Workforce Survey 2006*. Missouri Hospital Association.
- <sup>23</sup> U.S. Department of Labor, Employment and Training Administration. (2005) *Workforce Innovation in Regional Economic Development (WIRED) Initiative*. Retrieved from <http://www.doleta.gov/WIRED/>.
- <sup>24</sup> Graphs shared by NCHEMS (National Center for Higher Education Management Systems) Information Center through Patrick Kelly, Director. Graphs were based on the U.S. Census Bureau 2005 American Community Survey Public Use Microdata Sample File. [www.higheredinfo.org](http://www.higheredinfo.org).
- <sup>25</sup> Matt Woolsey, Forbes "Best Cities for Young Professionals", 6/21/07, [http://www.forbes.com/2007/06/21/cities-jobs-young-forbeslife-cx\\_mw\\_0621realestate.html](http://www.forbes.com/2007/06/21/cities-jobs-young-forbeslife-cx_mw_0621realestate.html)
- <sup>26</sup> Schultz, J. (2004) *Boon Town USA: The 7 ½ Keys to Big Success in Small Towns*. Herndon, Virginia: National Association of Industrial and Office Properties.